

Digestive System

The Breaking Down of Food

Enzyme - a protein capable of breaking down food into their most simple components

1. Carbohydrates ^{sugars} -- source of energy

- basically long chains of sugars which must be broken down into single sugars which can be ~~used~~ absorb by the blood

- these can then be used to convert ADP into ATP and any unused sugars will be stored in the liver.

• carbs begin to be broken down in the mouth as the salivary glands produce an enzyme called amylase which begins converting complex sugars into simpler ones. (polysaccharides into disaccharides)

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• these partially broken down carbs will travel to the duodenum to be further digested

• here ⁱⁿ (small intestine) the pancreas secretes more amylase and the small intestine secretes 3 enzymes: maltase, sucrase and lactase to finish breaking disaccharides into monosaccharides

x blood picks up monosaccharides, takes to cells for cellular respiration. Excess goes to liver or is stored as fat

2. Proteins -- needed for growth and repair of cells

the chemical breakdown of proteins begins in the stomach

the stomach secretes pepsin (an enzyme that must be activated by HCl). Pepsin begins to breakdown polypeptides into dipeptides

the pancreas secretes trypsin (enzyme) and sends it to the small intestine to also break polypeptides into dipeptides

finally the small intestine secretes peptidase (enzyme) to break dipeptides into amino acids which the blood can pick and deliver to the cells

in the cells the ribosomes will rearrange the amino acids back into the proteins that the cell requires.

3. Fats/Lipids -- needed for insulation, energy and to make cell membranes.

contain twice as many calories as the same amount of carbs...harder to breakdown

fats are first broken down (emulsified) into smaller pieces by bile (made in the liver stored in the gall bladder)..this occurs in the small intestine

the enzyme lipase which is produced in the pancreas is sent to the small intestine to finish breaking the fat down into fatty acids and glycerol which can be used as a source of energy or to form components such as the cell membrane, myelin sheath

Other secretions

1. the stomach secretes the enzyme rennin that causes milk to curdle (coagulate) this slows down the movement of milk so the protein component can be broken down

2. the pancreas secretes sodium bicarbonate and sends it to the small intestine. Sodium bicarbonate neutralizes the acid coming from the stomach and entering the small intestine.

Review Questions

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